

AMENDMENTS TO THE CLAIMS:

The listing of claims will replace all prior versions, and listings of claims in the application:

LISTING OF THE CLAIMS

1. (Canceled)
2. (Currently amended) An adaptive quality control loop for a rate adaptation based on modulation and coding scheme (MCS) levels and multiple spreading codes, the adaptive quality control loop comprising in the step of:

adjusting a first channel condition threshold in a transmitter based on a first error detection result from a receiver for a first data packet transmission between a the transmitter and a receiver using a first variable size step for the adjusting, wherein the first channel condition threshold is based on a first modulation and coding scheme (MCS) level used in the first data packet transmission, and the first variable size step is determined by the transmitter using a desired MCS error rate for the first MCS level.

3. (Currently amended) An adaptive quality control loop for a rate adaptation based on modulation and coding scheme (MCS) levels and multiple spreading codes, the adaptive quality control loop comprising in the step of:

adjusting a first channel condition threshold based on a first error detection result for a first data packet transmission between a transmitter and a receiver using a first variable size step, wherein the first channel condition threshold is based on a first modulation and coding scheme (MCS) level used in the first data packet transmission, and the first variable size step is determined using a desired MCS error rate for the first MCS level;

The adaptive quality control loop of claim 2, wherein the step of determining the first variable size step comprises the step of:

updating MCS probabilities for all MCS levels using the first error detection result;
updating an MCS error rate for the first MCS level; and

determining a ratio between a first variable size up step and a first variable size down step associated with the first variable size step using the updated MCS probabilities, MCS error rate and a target criterion.

4. (Original) The adaptive quality control loop of claim 2, wherein the desired MCS error rate for the first MCS level is based on a block error rate target criterion.

5. (Original) The adaptive quality control loop of claim 2, wherein the desired MCS error rate for the first MCS level is based on a block error rate target criterion, MCS probabilities for the first MCS level and for other MCS levels, and MCS error rates for the other MCS levels.

6. (Original) The adaptive quality control loop of claim 5, wherein the desired MCS error rate is determined by solving

$$p_d(m) = \frac{1}{P(m)} \left[P_{BLER}^{Target} - \sum_{n=1, n \neq M}^M p(n)P(n) \right]$$

where $p_d(m)$ is the desired MCS error rate, $P(m)$ is the MCS probability for the first MCS level, P_{BLER}^{Target} is the block error rate target criterion, $p(n)$ is the MCS error rates for a particular MCS level n , and $P(n)$ is the MCS probability for a particular MCS level n .

7. (Original) The adaptive quality control loop of claim 2, wherein the desired MCS error rate for the first MCS level is based on a bit error rate target criterion.

8. (Currently amended) The adaptive quality control loop of claim 2, wherein the desired MCS error rate for the first MCS level is based on a block-bit error rate target criterion, MCS probabilities for the first MCS level and for other MCS levels, average transmitted data rates for the first MCS level and for the other MCS levels, average rate of bit errors for the other MCS levels, and MCS error rates for the other MCS levels.

9. (Original) The adaptive quality control loop of claim 8, wherein the desired MCS error rate is determined by solving

$$p_d(m) = \frac{1}{R(m)P(m)} \left[P_{BER}^{Target} \sum_{n=1}^M R(n)P(n) - \sum_{n=1, n \neq M}^M X(n)P(n) \right]$$

where $p_d(m)$ is the desired MCS error rate, $P(m)$ is the MCS probability for the first MCS level, P_{BER}^{Target} is the bit error rate target criterion, $X(n)$ is the average rate of bit errors for a particular MCS level n , $R(n)$ is the average transmitted data rate for a particular MCS level n , $R(m)$ is the average transmitted data rate for the first MCS level, and $P(n)$ is the MCS probability for a particular MCS level n .

10. (Previously presented) The adaptive quality control loop of claim 2, wherein the step of adjusting the first channel condition threshold comprises the step of:

determining the first variable size step using a block or bit error rate target criterion and a first data rate associated with the first MCS level.

11. (Currently amended) An adaptive quality control loop for a rate adaptation based on modulation and coding scheme (MCS) levels and multiple spreading codes, the adaptive quality control loop comprising in the step of:

adjusting a first channel condition threshold based on a first error detection result for a first data packet transmission between a transmitter and a receiver using a first variable size step, wherein the first channel condition threshold is based on a first modulation and coding scheme (MCS) level used in the first data packet transmission, and the first variable size step is determined using a desired MCS error rate for the first MCS level;

The adaptive quality control loop of claim 2, wherein the first variable size step is associated with a first variable size up step and a first variable down step, the first channel condition threshold being increased an amount based on the first variable size up step if the first error detection result indicates the first data transmission was unsuccessful, the first channel condition threshold being decreased an amount based on the first variable size down step if the first error detection result indicates the first data transmission was successful.

12. (Previously presented) The adaptive quality control loop of claim 11, wherein for a block error rate target criterion, the first channel condition is adjusted an amount equal to the first variable size up step if the first error detection result indicates the first data transmission was unsuccessful, and the first channel condition is adjusted an amount equal to the first variable size down step if the first error detection result indicates the first data transmission was successful.

13. (Previously presented) The adaptive quality control loop of claim 11, wherein for a bit error rate target criterion, the first channel condition is adjusted an amount based on the first variable size up step and a data rate associated with the first data transmission if the first error detection result indicates the first data transmission was unsuccessful, and the first channel condition is adjusted an amount based on the first variable size down step and a data rate associated with the first data transmission if the first error detection result indicates the first data transmission was successful.

14. (Currently amended) The adaptive quality control loop of claim 13, wherein the first channel condition is adjusted an amount equal to $\delta(m)R(m, k)\Delta_{Up}(m)$ if the first error detection result indicates the first data transmission was unsuccessful, the first channel condition is adjusted an amount equal to $\delta(m)R(m, k)\Delta_{Down}(m)$ if the first error detection result indicates the first data transmission was successful, and $R(m, k)$ is the data rate associated with the first data transmission, $\Delta_{Up}(m)$ is the first variable size up step for the first MCS level, $\Delta_{Down}(m)$ is the first variable size down step for the first MCS level and $\delta(m)$ is a small fixed positive constant for the first MCS level.

15. (Original) The adaptive quality control loop of claim 11, wherein a ratio between the first variable up step and first variable down step are based on a desired MCS error rate for the first MCS level.

16. (Previously presented) The adaptive quality control loop of claim 2 comprising the additional steps of:

adjusting a second channel condition threshold based on a second error detection result for a second data packet transmission using a second variable size step, wherein the second channel condition threshold is associated with a second MCS level used in the second data packet transmission.

17. (Previously presented) The adaptive quality control loop of claim 2 comprising the additional steps of:

selecting a second MCS level based on an estimate of channel condition between the receiver and transmitter using a table having the adjusted first channel condition threshold.

18. (Original) The adaptive quality control loop of claim 17 comprising the additional steps of:

transmitting a second data packet using the second MCS level.

19. (Previously presented) The adaptive quality control loop of claim 2, wherein the step of adjusting the first channel condition threshold comprises the step of:

determining the first variable size step using the first error detection result.

20. (Previously presented) The adaptive quality control loop of claim 2 comprising the additional steps of:

adjusting a second channel condition threshold by a second amount equal to a first amount at which the first channel condition threshold was adjusted.

21. (New) The adaptive quality control loop of claim 3, wherein the step of adjusting the first channel condition threshold comprises the step of:

determining the first variable size step using a block or bit error rate target criterion and a first data rate associated with the first MCS level.